Single-Ply Roof Restoration

Contractor shall install Single-ply roof restoration using rolled urethane coating over polyester mat over existing EPDM roofing, parapet walls and roof penetrations that have been power washed and chemically cleaned.

The finished roof shall provide for a smooth consistent appearance.

Contractor is responsible for the removal of all debris, leaving the job site in a neat and orderly fashion, and controlling public access in and around work areas.

Contractors may schedule and attend a site visits at the Liberal and Neosho, MO locations before bidding. Site visits may be scheduled with Brain Manke, who may be reached at 417-629-3352.

***NOTE: It is the responsibility of the contractor to visit each site to take measurements and look over site. All sizes listed are approximate only.**

001.	Rt. 43, 2.5 Mi. N of Rt. 160, Liberal, MO (4,320 sq. ft.)	$
002.	Bus. Rt. 60 & Daugherty, Neosho, MO (1,500 sq. ft.)	$
003.	Unit cost for replacement per square foot of the following: Contractor shall provide the removal and disposal of all damaged EPDM and rigid insulation down to existing metal deck discovered before installation of the new urethane coating. Show damaged area to MoDOT field representative for approval. Replace in the same damaged area, new rigid insulation and EPDM to match existing. Price shall include installation of any related flashing and patch material as required. ***Cost evaluation of this line item shall be evaluated assuming 5% of the EPDM roof area.***	$

SECTION 07563
Single-Ply Roofing Restoration

PART 1 GENERAL

1.1 RELATED DOCUMENTS

B. Drawings and general provisions of the Contract, including the Conditions of the Contract and Division 01 Specification Sections apply to this section.

1.2 SUMMARY

A. Section includes:
1. Preparation of existing single-ply roof system for restoration.
2. Restoration procedures.

B. Related Sections:
1. Section 07 56 31 - Preparation for Restoration
2. Sheet Metal Flashing and Trim: Section 07 62 00 – Sheet Metal Flashing and Trim.
3. Sheet Metal Roof Accessories: Section 07 71 00 – Roof Specialties.

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):
1. ASTM D1079, Terminology Relating to Roofing, Waterproofing, and Bituminous Materials.

C. National Roofing Contractors Association (NRCA):
1. Roofing and Waterproofing Manual.

1.4 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, reinstalled, or otherwise indicated to remain Owner's property, demolished materials become Contractor's property and shall be removed from Project site.

1.5 SUBMITTALS

A. Product Data: Provide manufacturer s technical product data for each type of roofing product specified. Include data substantiating that materials comply with specified requirements.

B. Manufacturer’s Product Data and description of temporary roofing system. If temporary roof will remain in place, submit surface preparation requirements needed to receive permanent roof.

C. Documentation of Existing Conditions: Document existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces that might be misconstrued as having been damaged by re-roofing operations. Submit before Work begins. Use high-resolution digital photographs or videotape supplemented by written commentary for preparing reports.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning membrane-roofing removal. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Installer: Company specializing in roof restoration with a minimum 10 years (documented) experience and certified by roofing system manufacturer as qualified to install manufacturer's roofing materials.

C. Installer's Field Supervision: Maintain a full-time Supervisor/Foreman on job site during all phases of roofing work and at any time roofing work is in progress. Maintain proper supervision of workmen. Maintain a copy of the specifications in the possession of the Supervisor/Foremen and on the Site at all times.

D. Insurance Certification: Assist Owner in preparation and submittal of roof installation acceptance certification as may be necessary in connection with fire and extended coverage insurance on roofing and associated work.

1.5 PRE-INSTALLATION CONFERENCE

A. Preliminary Re-roofing Conference: Convene a pre-roofing conference approximately two (2) weeks before scheduled commencement of reproofing installation and associated work.

B. Require attendance of installer of each component of associated work, installers of deck or substrate construction to receive roofing work, installers of rooftop units and other work in and around roofing which must precede or follow roofing work (including mechanical work if any), Architect, Owner, roofing system manufacturer s representative, and other representatives directly concerned with performance of the Work, including (where applicable) Owner s insurers, testing agencies and governing authorities. Objectives of conference include:

1. Review foreseeable methods and procedures related to re-roofing work.
2. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by others.
3. Review structural loading limitations of deck and inspect deck for loss of flatness and for required attachment.
4. Review and finalize construction schedule related to re-roofing work and verify availability of materials, installer s personnel, equipment and facilities needed to make progress and avoid delays.
5. Review weather and forecasted weather conditions and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not mandatory requirement).
6. Record discussion of conference including decisions and agreements (or disagreements) reached and furnish copy of record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.
7. Review notification procedures for weather or non-working days.

1.6 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately below re-roofing area. Conduct re-roofing so Owner's operations will not be disrupted. Provide Owner with not less than **72**-hours notice of activities that may affect Owner's operations

1. Coordinate work activities daily with Owner so Owner implement protective dust or water leakage covers over sensitive equipment or furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, or evacuate occupants from below the work area.

2. Before working over structurally-impaired areas of deck, notify Owner to evacuate occupants from below the affected area. Verify that occupants below the work area have been evacuated prior to proceeding with work over the impaired deck area.

B. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

C. Owner assumes no responsibility for condition of areas to be re-roofed. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.

D. Weather Condition Limitations: Do not apply roofing membrane during inclement weather or when a 40% chance of precipitation is expected.

E. Proceed with roofing work only when existing and forecasted weather conditions will permit unit of work to be installed in accordance with manufacturer s recommendations and warranty requirements.

F. Materials shall be stored at room temperature until immediately prior to application. Discontinue the application if the material cannot be stored at a temperature, which permits even distribution during application.

G. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed during same day.

H. When applying materials with spray equipment, take precautions to prevent over spray and/or solvents from damaging or defacing surrounding walls, building surfaces, vehicles or other property. Care should be taken to do the following:

1. Close air intakes into the building.
2. Have a dry chemical fire extinguisher available at the jobsite.
3. Post and enforce “No Smoking” signs.

I. Do not inhale spray mist; take precautions to ensure adequate ventilation.

J. Protect completed roof sections from foot traffic for a period of at least 48 hours at 75° F and 50% relative humidity or until fully cured.

K. Take precautions to ensure that materials do not freeze.

L. Minimum temperature for application is 40°F and rising.

1.7 WARRANTY

A. Upon completion of installation, and acceptance by the Owner, the manufacturer will supply to the Owner the specified 10-year warranty**.** This Manufacturer warranty will cover all defects in workmanship and materials.

B. Installer will submit a two (2) year warranty to the membrane manufacturer with a copy directly to Owner. The Contractor will inspect the roof with the Owner’s Representative 18 months after completion, and, at the Contractor's expense, correct any workmanship defects before the 24th month following completion of the project.

C. Membrane manufacturer will provide a semi-annual inspection for the life of the warranty.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver products to site with seals and labels intact, in manufacturer’s original containers, dry and

undamaged.

B. Store and handle roofing sheets in a dry, well-ventilated, weather-tight place to ensure no possibility of significant moisture exposure. Store rolls of felt and other sheet materials on pallets or other raised surface. Stand all roll materials on end. Cover roll goods with a canvas tarpaulin or other breathable material (not polyethylene).

C. Do not leave unused materials on the roof overnight or when roofing work is not in progress unless protected from weather and other moisture sources.

D. It is the responsibility of the contractor to secure all material and equipment on the job site. If any material or equipment is stored on the roof, the contractor must make sure that the integrity of the deck is not compromised at any time. Damage to the deck caused by the contractor will be the sole responsibility of the contractor and will be repaired or replaced at his expense.

1.9 MANUFACTURER'S INSPECTIONS

A. When the project is in progress, the roofing system manufacturer will provide the following:

1. Keep the owner informed as to the progress and quality of the work as observed.
2. Provide job site inspections a minimum of three days a week.
3. Report to the Owner in writing any failure or refusal of the Contractor to correct unacceptable practices called to the Contractor's attention.
4. Confirm after completion that manufacturer has observed no applications procedures in conflict with the specifications other than those that may have been previously reported and corrected.
5. Daily progress reports are required and shall be submitted via online data-base to the owner for review. Progress Reports will include photo documentation and notes describing installation process.

PART 2 PRODUCTS

2.1 PRODUCTS, GENERAL

A. Refer to Division 01 Section "Common Product Requirements."

B. Basis of Design: Materials, manufacturer's product designations, and/or manufacturer's names specified herein shall be regarded as the minimum standard of quality required for work of this Section. Comply with all manufacturer and contractor/fabricator quality and performance criteria specified in Part 1.

C. Substitutions: Products proposed as equal to the products specified in this Section shall be submitted in accordance with Bidding Requirements and Division 01 provisions.

1. Proposals shall be accompanied by a copy of the manufacturer's standard specification section. That specification section shall be signed and sealed by a professional engineer licensed in the state in which the installation is to take place. Substitution requests containing specifications without licensed engineer certification shall be rejected for non-conformance.

2. Equivalency of performance criteria, warranty terms, submittal procedures, and contractual terms will constitute the basis of acceptance.

3. The Owner's decision regarding substitutions will be considered final. Unauthorized substitutions will be rejected.

2.2 DESCRIPTION

A. Restoration work including but not limited to:

1. White-Knight: A multi-purpose, high build, urethane, liquid waterproofing membrane designed to maintain, restore and upgrade the performance of existing single-ply membranes.

a.	Elongation (ASTM D 412)	360%
b.	Tensile Strength (ASTM D 412)	1500 psi
c.	Tear Resistance (ASTM D 1004)	140 lbs/in.
d.	Energy Star Approved	Yes

2.3 SINGLE PLY MEMBRANE CARACTERISTICS

A. All field and flashing repairs made with single ply membrane must be done with a cured membrane of a like material to the existing roof membrane

1. EPDM Unreinforced

a.	Elongation (ASTM D 4637)	300%
b.	Tearing Strength (ASTM D 751)	150 lbs.f
c.	Brittleness Point (ASTM D 2137)	-49º
d.	Thickness of membrane (ASTM D 751)	.045"

2.4 WASHES FOR MEMBRANE PREPARATION

A. Primer washed used to prepare single ply membrane for repairs.

B. Ultra-Shield Primer/Wash ---- A solvent based cleaner designed to prep the surface, before applying Ultra-Shield Single Ply Membrane Tape or for cleaning a single ply membrane or preparation for any repair situation.

C. Cleaner wash for preparing surface for polyurethane coating.

D. Simple Green----All-purpose Industrial degreaser/cleaner

2.5 ADHESIVES/SEALANTS

A. Adhesives used to adhere single ply membranes in field and flashing repairs.

1. Lap Sealant ---- A one-part, elastomeric sealant designed for sealing the exposed edge of an EPDM, against the effects of weathering.

<or>

2. Pliobond 9053 Splice Adhesive ---- A butyl-based contact adhesive with high initial green strength and excellent long term durability. Can be used to adhere cleaned surfaced of EPDM single-ply membranes to each other

2.6 POLYESTER REINFORCMENT PHYSICAL PROPERTIES

A. Grip Polyester Soft: a full strand polyester reinforcing mat.

1.	Elongation (ASTM D 1682)	44%
2.	Tearing Strength (ASTM D 1682)	17 lbs
3.	Tensile	75 lbs.
4.	Weight	3 oz/sq. yd

PART 3 - EXECUTION

3.1 EXECUTION, GENERAL

A. Comply with requirements of Division 01 Section “Common Execution Requirements.”

3.2 EXAMINATION

A. Examine substrate surfaces to receive coating and associated work and conditions under which roofing will be installed. Do not proceed with roofing until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

3.3 GENERAL INSTALLATION REQUIREMENTS

A. Cooperate with manufacturer, inspection and test agencies engaged or required to perform services in connection with installing the roof system.

B. Insurance/Code Compliance: Where required by code, install and test the roofing system to comply with governing regulation and specified insurance requirements.

C. Protect other work from spillage of roofing materials and prevent materials from entering or clogging drains and conductors. Replace or restore other work damaged by installation of the modified bituminous roofing system.

D. Urethane coating Rate: Urethane coating shall be applied at no less than two (2) gallons per one hundred (100) square feet for non-reinforced system and no less than four (4) gallons per one hundred (100) square feet for full reinforced system.

E. Apply roofing materials as specified herein unless recommended otherwise by manufacture’s instructions. Keep roofing materials dry during application. Do not permit phased construction.

3.4 CLEANING AND SURFACE PREPARATION

A. All defects such as deteriorated roof decks must be repaired; saturated insulation board must be replaced, etc. per Garland specifications prior to application of the urethane coating materials. Verify that exiting conditions meet the following requirements:

1. The exiting membrane is either fully adhered or that the membranes mechanical fasteners are secured and functional.
2. Application of roofing materials over a brittle roof membrane is not recommended.

B. Remove all loose dirt and foreign debris from the roof surface.

C. Do not damage roof membrane in cleaning process.

D. Clean and seal all parapet walls, gutters and coping caps, and repair any damaged metal where necessary. Seal watertight all fasteners, pipes, drains, vents, joints and penetrations where water could enter the building envelope.

E. Clean the entire roof by removing all dirt, algae, paint, oil, talc, rust or foreign substance. Use a 10% solution of Simple Green and warm water. Scrub heavily soiled areas with a brush. Rinse with fresh water to remove all Simple Green solution. In ponding areas be sure to rinse at least twice to make sure all cleaning solution is rinsed clean. Cleaning residue will act as a bond breaker if not properly rinsed. Allow roof to dry before continuing.

F. Repair existing roof membrane as necessary to provide a sound substrate for the liquid membrane. All surface defects (cracks, blisters, tears) must be repaired with similar cured material.

G. Repair existing roof membrane as necessary to provide a sound substrate for the liquid membrane. Repair all surface defects (cracks, blisters, tears):

H. Blister Repairs

1. Clean the repair area.

2. All blisters must be cut and opened. Use a roofer's knife to open the blister with an "X" or "H" cut. Fold the flaps and remove any existing moisture. Permit the area to dry before applying repair materials.

3. All membranes require reinforcement or self-stick EPDM flashing membrane and butyl tape, on all of the seams.

4. After positioning reinforcement to roll out, apply White-Knight about 8 in (200 mm) wide to surface where reinforcement ply is going to be applied. Do not apply White-Knight too far ahead of fabric or coating may dry before fabric can be embedded. The minimum application rate should be 1.5 gallons per 100 square feet (1.5 liters/m^2). Immediately roll 6 in (150 mm) or 12" width reinforcement into coating. Care should be taken to lay the fabric tight to the roof surface without air pockets, wrinkles, fishmouths, etc.

5. After embedding reinforcement into the White-Knight, apply additional White-Knight/Stallion to completely saturate the fabric at minimum application rate of 1 gallon per 100 square feet (1 liters/m^2). This saturation coat should be applied as soon as possible after embedding reinforcement into the White-Knight.

6. During this process be sure to keep the application saturated with White-Knight to prevent plucking or snagging of reinforcement. Allow to dry for a minimum of 24 hours before applying finish coats.

I. Tears and Open Lap Repairs

1. All tears and open laps require reinforcement or self-stick EPDM flashing membrane and butyl tape, on all of the seams.

2. After positioning reinforcement to roll out, apply White-Knight about 8 in (200 mm) wide to surface where reinforcement ply is going to be applied. Do not apply White-Knight too far ahead of fabric or coating may dry before fabric can be embedded. The minimum application rate should be 1.5 gallons per 100 square feet (1.5 liters/m^2).

Immediately roll 6 in (150 mm) or 12" width reinforcement into coating. Care should be taken to lay the fabric tight to the roof surface without air pockets, wrinkles, fishmouths, etc.

3. After embedding reinforcement into the White-Knight, apply additional White- Knight to completely saturate the fabric at minimum application rate of 1 gallon per 100 square feet (1 liters/m²). This saturation coat should be applied as soon as possible after embedding reinforcement into the White-Knight.

4. During this process be sure to keep the application saturated with White-Knight to prevent plucking or snagging of reinforcement. Allow to dry for a minimum of 24 hours before applying finish coats.

3.5 PRE-TREATMENTS

A. Known Growth - General Surfaces: After areas of moss, mold, algae and other fungal growths or vegetation have been removed and surfaces have been thoroughly cleaned, apply a biocidal wash (TSP, Simple Green, Ultra-Shield Primer/Wash) at a maximum spread rate of 0.2 gallons/square, to guard against subsequent infection. Allow to dry onto absorbent surfaces before continuing with the application. On non-absorbent surfaces, allow to react before thoroughly rinsing to remove all traces of the solution. Note: See Health & Safety data before use.

3.6 SYSTEM APPLICATION PARTIALLY REINFORCED

A. Applying Reinforcement and White-Knight to field seams to be covered.

1. Determine where 1st run of 6 in (150 mm) or 12" reinforcement will be started.

2. After positioning reinforcement to roll out, apply White-Knight about 8in (200 mm) wide to surface where reinforcement ply is going to be applied. Do not apply White-Knight too far ahead of fabric or coating may dry before fabric can be embedded. The minimum application rate should be 1.5 gallons per 100 square feet (1.5 liters/m²). Immediately roll 6 in (150 mm) width reinforcement into coating. Care should be taken to lay the fabric tight to the roof surface without air pockets, wrinkles, fishmouths, etc.

3. After embedding reinforcement into the White-Knight, apply additional White-Knight to completely saturate the fabric at minimum application rate of 1 gallon per 100 square feet (1 liters/m²). This saturation coat should be applied as soon as possible after embedding reinforcement into the White-Knight.

4. Total White-Knight used to embed and saturate the reinforcement should be a minimum of 2.5 gallons per 100 square feet (2.5 liters/m²).

5. During this process be sure to keep the application saturated with White-Knight to prevent plucking or snagging of reinforcement. Allow to dry for a minimum of 24 hours before applying finish coats.

B. Application of White-Knight Finish Coats

1. Before application of finish coat your local Manufactures Representative needs to inspect application.

2. After field seam application has been complete and allowed to dry, apply White-Knight in a uniform manner at minimum application rate of 2 gallon per 100 square feet (2 liters/m^2).

3. During final application of the White-Knight special attention should be given to coating flashings and other critical areas to build adequate membrane thickness. Multiple coats may be necessary on verticals to prevent sagging. In any event all specified material must be applied and minimum membrane thickness achieved.

C. Membrane Deterioration:

1. It is recommended that a polyester mat be used over areas of the membrane that are in deteriorated condition.
2. Apply urethane coating at a rate of 2 gallons per square, embed fiberglass/polyester mat and brush in.
3. Let material dry 24 hours, before coating the field of the roof with 2 gallons (32 mils) per square.

D. Coating shall be applied in strict accordance with manufacture's published directions and instructions.

1. Manual Application:

a. Pour urethane coating onto roof in 24'' rows and spread with ½" nap or foam roller.
b. Back roll urethane coating with an 18" wide 1/2" nap roller for even application. Quality check that coating meets 2 gallons per square (32 mils wet film thickness).

1. 1.5gallons will equal 24 wet mils and 19 dry mils
2. 2 gallons will equal 32 wet mils and 25 dry mils
3. 2.5 gallons will equal 40 wet mils and 32 dry mils
4. 4 gallons will equal 64 wet mils 51 dry mils

3.7 FIELD QUALITY CONTROL

A. Require attendance of roofing materials manufacturers' representatives at site during installation of the roofing system. Perform field inspection as required [under provisions of Division 01].

B. Correct defects or irregularities discovered during field inspection.

3.8 FINAL INSPECTION

A. At completion of roofing installation and associated work, meet with Contractor, installer, installer of associated work, Owner, roofing system manufacturer's representative and other representatives directly concerned with performance of roofing system.

B. Walk roof surface areas of the building, inspect perimeter building edges as well as flashing of roof penetrations, walls, curbs and other equipment. List all items requiring correction or completion and furnish copy of list to each party in attendance.

C. The roofing system manufacturer reserves the right to request a thermographic scan of the roof during final inspection to determine if any damp or wet materials have been installed. The

thermographic scan shall be provided by the Roofing Contractor.

D. If core cuts verify the presence of damp or wet materials, the Roofing Contractor shall be required to replace the damaged areas at his own expense.

E. Repair or replace deteriorated or defective work found at time above inspection as required to a produce an installation which is free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

F. Notify the Owner upon completion of corrections.

G. Following the final inspection, provide written notice of acceptance of the installation from the roofing system manufacturer.

3.9 CLEANING

A. Remove adhesive drippings from all walls, windows, floors, ladders and finished surfaces.

B. In areas where finished surfaces are soiled by asphalt or any other sources of soiling caused by work of this section, consult manufacturer of surfaces for cleaning instructions and conform to their instructions.

C. Repair or replace defaced or disfigured finishes caused by work of this section.

3.10 CONSTRUCTION WASTE MANAGEMENT

A. Remove and properly dispose of waste products generated during roofing procedures. Comply with requirements of authorities having jurisdiction

3.11 DEMONSTRATION AND TRAINING

A. At a time and date agreed to by the Owner, instruct the Owner's facility manager, or other representative designated by the Owner, on the following procedures:

1. Roof troubleshooting procedures.
2. Notification procedures for reporting leaks or other apparent roofing problems.
3. Roofing maintenance.
4. The Owner's obligations for maintaining the roofing warranty in effect and force.
5. The Manufacturer's obligations for maintaining the roofing warranty in effect and force.

END OF SECTION